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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,843	12/31/2003	Seung Jong Yoo	OG03-042	9453

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EXAMINER

VINH, LAN

ART UNIT PAPER NUMBER

1765

DATE MAILED: 02/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/749,843

Applicant(s)

YOO, SEUNG JONG

Examiner

Lan Vinh

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 December 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 14 recite the limitation "the exposed lower insulating layer". There is insufficient antecedent basis for this limitation in the claims.

Claims 2-4, 10, 11, 15, 16-17 are indefinite because they depend on claim 1

Claim 5 is indefinite because it depends on itself. Claims 6-9, 12-13, 18 are indefinite because they depend on 5

For the purpose of examination, claim 5 is best understood as depending on claim 1

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 10-11, 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Chien et al (US 5,643,824)

Chien discloses a method of forming field oxide regions in a semiconductor substrate. The method comprises the steps of:

forming a lower insulating layer 13 (oxide) and a SiN layer 16/sacrificial layer on a semiconductor substrate 10 (col 3, lines 59-65)

patterning the layer 16/sacrificial layer and forming spacers 24 are formed on sidewalls of the layer 16/sacrificial layer, the spacers 24 comprising polymer passivation resulting from patterning the layer 16 (col 4, lines 2-45)

etching/removing the exposed lower insulating layer 13 to form lower insulating layer pattern (col 5, lines 45-50; fig. 3B-3C)

removing the SiN/sacrificial layer pattern and the spacers 24 (col 5, lines 35-38; fig. 6)

The limitations of claims 2, 15 have been discussed above

Regarding claim 3, Chien discloses that the spacer 24 having a width of 0.1 microns (1000 angstroms) (col 4, lines 16-18)

Regarding claim 10, Chien discloses wet etching the insulating layer 13 (col 5, lines 35-39)

Regarding claim 11, Fig. 3C of Chien shows that a portion/region removed from the lower insulating layer 13 has a narrow linewidth

Regarding claim 14, since Chien discloses using the same steps, structure and materials as the claimed invention, under the principle of inherency, Chien method would have inherently increase a coupling ratio of a nonvolatile memory device relative

to a method that removes the exposed lower insulating layer using the sacrificial layer pattern alone as an etching mask

Regarding claim 16, Chien discloses forming tunnel oxide 12 on the semiconductor substrate 10 (col 3, lines 36-37; fig. 1)

Regarding claim 17, Chien discloses that the nitride layer can be formed of SiN/polysilicon (col 3, lines 38-40; fig. 1)

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5-9, 12-13, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chien et al (US 5,643,824) in view of Chapman (US 5,976,769)

Chien method has been described above. Unlike the instant claimed invention as per claims 5-8, Chien fails to disclose forming a photoresist pattern on the sacrificial layer, irradiating the photoresist with a source of light having an I-line wavelength, the etched region of the sacrificial layer pattern has a narrower linewidth than that defined by the photoresist pattern

Chapman discloses a method of forming a patterned photoresist comprises the steps of to disclose forming a photoresist pattern 911 on the sacrificial layer 917, irradiating the photoresist with a source of light having an I-line wavelength (col 3, lines 5-7; col 6,

lines 15-20), the etched region of the sacrificial layer pattern has a narrower linewidth than that defined by the photoresist pattern (fig. 8d)

One skilled in the art at the time the invention was made would have found it obvious to modify Chien by adding a step of forming a photoresist pattern on the sacrificial layer as per Chapman because according to Chapman, the formation of semiconductor structure typically involves definition of the locations of such structure in a layer of photoresist on a layer by exposure of the photoresist with light passing through a reticle containing the desired structure pattern (col 1, lines 13-22)

Regarding claim 12, Chien discloses wet etching the insulating layer 13 (col 5, lines 35-39)

Regarding claim 13, Fig. 3C of Chien shows that a portion/region removed from the lower insulating layer 13 has a narrow linewidth

Regarding claim 18, Chien discloses patterning the layer 16/sacrificial layer and forming spacers 24 are formed on sidewalls of the layer 16/sacrificial layer, the spacers 24 comprising polymer passivation resulting from patterning the layer 16 (col 4, lines 2-45)

***Allowable Subject Matter***

5. Claim 4 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

6. Applicant's arguments with respect to the rejection(s) of claims 1-4 under U.S.C 103(a) based on Ahn and Keller have been considered but are moot in view of the new ground(s) of rejection. The argument that Ahn is silent with regard to spacer comprising polymer resulting from the patterning of a sacrificial layer. This argument is moot in view of the new ground of rejection based on Chien that discloses patterning/etching the layer 16/sacrificial layer to form polymer passivation spacer 24.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LV

February 9, 2006